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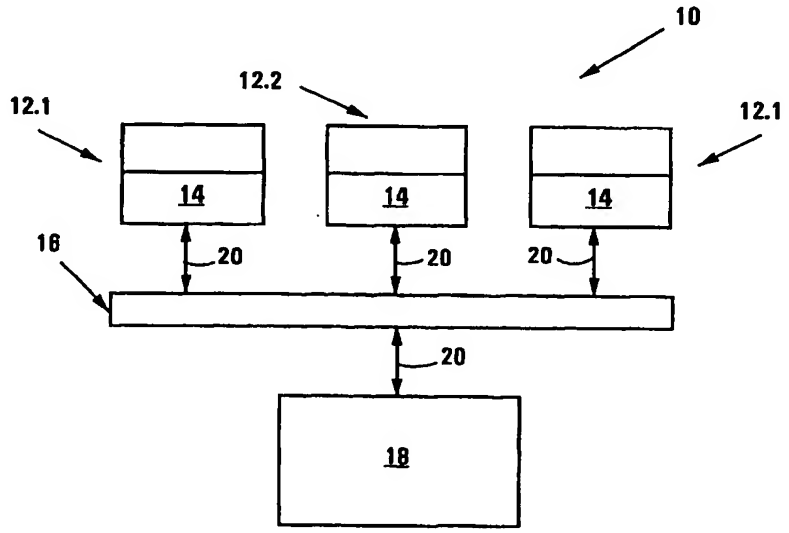

(57) Abstract

This invention relates to a disabling system for disabling an electrical device when the device is removed from a selected zone. The system includes a master unit (18) which contains transmitter means for transmitting an enabling signal in the zone and at least one slave unit (14) which is operably connected to an electrical device (12.1 to 12.3). The enabling signal (20) is typically transmitted via an electrical installation (16) in the zone. The slave unit (14) includes a receiver means for receiving the enabling signal when the electrical device is in the selected zone, and a disabling means for disabling the device when the enabling signal is not received thereby to disable the device when it is removed from the zone. The invention also extends to a method of disabling an electrical device when the device is removed from the selected zone, and to a master unit and a corresponding slave unit for the disabling system.

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DISABLING AN ELECTRICAL DEVICE

THIS INVENTION relates to disabling an electrical device. In particular, the invention relates to a method of, and a system for, disabling an electrical device when removed from a selected zone. It also relates to a master unit and a slave unit for use in the system.

For the purposes of this specification, the words electrical device should be interpreted broadly to include all types and makes of home appliances, personal computers, machinery (light and industrial), television sets, video machines, laptops, washing machines, fridges, freezers, DVD players, hi-fi systems, PDAs, radios, portable radios, kettles, toasters, electric drills, grinders, motors, liquidisers, turntables, sawing machines, sewing machines, overlockers, or any other device or apparatus which requires electrical power for its functioning.

According to a first aspect of the invention, there is provided a method of disabling an electrical device when removed from a selected zone, the method including

providing a master unit and at least one slave unit in the zone, the slave unit being fitted to the electrical device;

transmitting an enabling signal in the zone from the master unit for reception by the slave unit;

monitoring reception of the enabling signal by means of the slave unit; and

disabling the electrical device when the enabling signal is not received.

The method may include encoding the enabling signal at the master unit and decoding the enabling signal at the slave unit.

In one embodiment of the invention the selected zone may be in the form of a building and the method may include transmitting the enabling signal via an electrical power installation of the building.

The slave unit may include a user identification code which is preprogrammed into the slave unit, and the method may further include

transmitting a master identification code with the enabling signal, the master identification code being associated with the master unit;

comparing the master identification code and the user identification code at the slave unit; and

disabling the electrical device when the master and user identification codes do not correspond.

The user identification code may be entered into the slave unit in order to enable re-programming of the slave unit for use with a different master unit. This enables the device to be resold and used in a zone controlled by a different master unit.

The method may further include programming a unique slave unit identification code into the slave unit thereby uniquely to identify the slave unit.

The method may further include programming a unique device identification code into the slave unit thereby uniquely to identify the electrical device with which it is associated. The device identification code may include information relating to the make, model or type of electrical device.

The method may include transmitting the unique device and slave unit identification codes from the slave unit to the master unit.

The method may include monitoring reception of the enabling signal via an electrical power cable of the electrical device.

According to a second aspect of the invention, there is provided a disabling system for disabling an electrical device when removed from a selected zone, the system including

a master unit including transmitter means for transmitting an enabling signal in the zone;

at least one slave unit operably connected to the electrical device, the slave unit including

receiver means for receiving the enabling signal when the electrical device is in the selected zone; and

disabling means for disabling the electrical device when the enabling signal is not received thereby to disable the electrical device when removed from the selected zone.

The master unit may include an encoder for encoding the enabling signal and the slave unit may include a decoder for decoding the enabling signal.

The slave unit may be integrally formed with the electrical device. For example, the slave unit may be manufactured as part of the electrical device circuitry.

In one embodiment of the invention the selected zone may be in the form of a building and the transmitter and receiver means may be connected to an electrical power installation of the building and operable to communicate via the electrical power installation.

The master unit may include master storage means for storing a master identification code and the slave unit may include

slave storage means for storing a user identification code; and

comparator means for comparing the master and user identification codes, the disabling means being active or operative when the codes do not correspond thereby to disable the electrical device.

The slave unit may include slave programming means for programming the user identification code into the slave storage means, the slave programming means being arranged so that the user identification code must be entered into the slave unit in order to enable re-programming of the slave unit for use with a different master unit. This will enable the device to be resold and used in a zone controlled by a different master unit.

The slave programming means may be operable to program a unique slave unit identification code into the slave storage means thereby uniquely to identify the slave unit.

The slave programming means may also be operable to program a device identification code into the slave storage means thereby uniquely to identify the electrical device. The device identification code may include information relating to the make, model or type of electrical device.

The master unit may include a master programming means for programming the slave unit with the user identification code.

The master and slave units may include smart card interfaces for receiving smart cards bearing identification codes.

According to a third aspect of the invention, there is provided a slave unit for use in a disabling system for disabling an electrical device in a selected zone, the slave unit being connected to the electrical device and including

receiver means for receiving an enabling signal transmitted by a master unit associated with the zone when the electrical device is in the selected zone; and

disabling means for disabling the electrical device when the enabling signal is not received to disable the electrical device when removed from the selected zone and thereby prevent use of the device.

The slave unit may include a decoder for decoding the enabling signal operatively encoded by the master unit.

The slave unit may be integrally formed with the electrical device. For example, the slave unit may be manufactured as part of the electrical device circuitry.

In one embodiment of the invention the selected zone may be in the form of a building and the receiver means may be operatively connected to an electrical power installation of the building and operable to receive communications via the electrical power installation.

The slave unit may include

slave storage means for storing a user identification code; and

comparator means for comparing a master identification code included in the enabling signal and the user identification code, the disabling means being active when the codes do not correspond.

The slave unit may include slave programming means for programming the user identification code into the slave storage means, the slave programming means being arranged so that the user identification code must be entered into the slave unit in order to enable re-programming of the slave unit for use with a different master unit.

The slave programming means may be operable to program a unique slave unit identification code into the slave storage means thereby uniquely to identify the slave unit.

The slave programming means may also be operable to program a device identification code into the slave storage means thereby uniquely to identify the electrical device. The device identification code may include information relating to the make, model or type of electrical device.

The slave unit may include a smart card interface for receiving a smart card bearing at least one identification code.

According to a fourth aspect of the invention, there is provided a master unit for use in a disabling system for disabling an electrical device in a selected zone by means of a slave unit connected to the electrical device, the master unit including transmitter means for transmitting an enabling signal in the zone for reception by the slave unit which is operable to disable the device if the enabling signal is not received.

The master unit may include an encoder for encoding the enabling signal for transmission to the slave unit.

In one embodiment of the invention the selected zone is in the form of a building and the transmitter means is connected to an electrical power installation of the building and operable to communicate with the slave unit via the electrical power installation.

The master unit may include master storage means for storing a master identification code for inclusion with the enabling signal and which uniquely identifies the master unit.

The master unit may include a master programming means for programming the slave unit with the user identification code.

The master unit may include a smart card interface for receiving a smart card bearing at least one identification code. This may for example be in the form of a SIM card, magnetic strip or the like.

The invention is now described, by way of example, with reference to the accompanying diagrammatic drawings.

Referring to the drawings,

Figure 1 shows a schematic block diagram of a disabling system in accordance with the invention;

Figure 2 shows a schematic block diagram of a master unit, also in accordance with the invention, for use in the system of Figure 1;

Figure 3 shows a schematic block diagram of a slave unit also in accordance with the invention, for use in the system of Figure 1;

Figure 4 shows a schematic flow chart of the steps involved in programming the slave unit of Figure 3;

Figure 5 shows a schematic flow chart of the steps involved in erasing a user identification code from the slave unit;

Figure 6 shows a schematic flow chart of the master unit protocol; and

Figure 7 shows a schematic flow chart of the slave unit protocol.

Referring to the drawings, reference numeral 10 generally indicates a disabling system, in accordance with the invention, for disabling a plurality of appliances or electrical devices 12.1 to 12.3 (only three of which are shown in the drawings). Each device 12.1 to 12.3 is fitted with a slave unit 14, also in accordance with the invention, which communicates via a conventional electrical power or wiring installation 16 with a master unit 18, also in accordance with the invention. As described in more detail below, the master unit 18 intermittently transmits an enabling signal 20 via the wiring installation 16 to each slave unit 14 which is operable to disable an associated electrical device 12.1 to 12.3 when the disabling signal is no longer received.

The wiring installation 16 defines a zone typically within a building or the like where the electrical devices 12.1 to 12.3 are used. Preferably, each slave unit 14 is integrally formed with its associated electrical device 12.1 to 12.3 at the time of manufacture of the electrical device 12.1 to 12.3. However, it is to be appreciated, that the slave units 14 may be subsequently fitted to the devices 12.1 to 12.3. The slave units 14 are fitted so that each slave unit 14 receives the enabling signal 20 via an electrical power cord or cable of the electrical device 12.1 to 12.3 and, accordingly, when the electrical device 12.1 to 12.3 is plugged into a power socket of the wiring installation 16, the slave unit 14 sources both the enabling signal 20 and its power requirements directly from the electrical wiring installation 16.

Referring in particular to Figure 2 of the drawings, the master unit 18 includes a microprocessor based master controller 22, master unit storage means or memory 24, a smart card interface or reader 26 for receiving a smart card 28, programming circuitry 30, a programming interface 32, a powerline transceiver 34, and optional external encryption algorithms and data packaging 36. The powerline transceiver 34 is arranged to transmit data sourced from the programming circuitry 30 of the master controller 22 to each slave unit 14. In certain more sophisticated embodiments of the invention, the master unit 18 includes a GSM interface 38 for interfacing the master unit 18 to a GSM telephone network, an RS 232 or the like interface 40 for interfacing the master unit 18 to a personal computer or the like, a blue tooth interface 42, or the like.

Further, in other embodiments of the invention, communication from the master unit 18 to each slave unit 14 may be by

means of conventional RF technology. Accordingly, the master unit 18 may optionally include a master RF transceiver 42 which may replace or supplement the powerline transceiver 34. In the simplest form of the invention, unidirectional communication between the master unit 18 and each slave unit 14 takes place. However, in more sophisticated embodiments of the invention, bidirectional communication between each slave unit 14 and the master unit 18 takes place.

Each slave unit 14 includes a microprocessor based slave controller 44, slave storage means or memory 46, a decoder/encoder 48, a CEBus communications unit 50, a slave powerline transceiver 52, and disabling means 54 for disabling its associated electrical device 12.1 to 12.3. The slave powerline transceiver 52 communicates via an electrical cord or cable 56 of the electrical device 12.1 to 12.3 and which is normally plugged into a power socket of the wiring installation 16 in a conventional fashion. In certain embodiments of the invention where the master unit 18 includes a master RF transceiver 42 (see Figure 2), the slave unit 14 may in addition or instead include a slave RF transceiver which replaces or adds to the slave powerline transceiver 52.

The master controller 22 and the slave controller 44 include appropriate software to enable communication between the units 14, 16 using conventional communication or protocol standards. Accordingly, the units 14 and 18 may use the following protocol/communication standards: CEBus, Lon Works, TCP/IP, Token Passing MAC, SWAP (Shared Wireless Access Protocol), HTML, HTTP, XML, WAP (Wireless Application Protocol), or the like.

The system 10 may be used to monitor the unauthorised removal e.g. theft or the like, of the electrical devices 12.1 to 12.3 from the selected zone. The disabling means 54 of the slave unit 14 may be a relay, electronic switch, or the like which is connected to electrical circuitry of its associated electrical device 12.1 to 12.3. In certain embodiments in which the electrical device 12.1 to 12.3 includes an internal processor, the disabling means 54 may communicate an appropriate disabling command to the processor which disables the electrical device 12.1 to 12.3. In use, when the slave unit 14 is plugged into a mains power outlet or socket and the enabling signal 20 from the master unit 18 is intermittently received, the slave unit 14 permits normal operation of the electrical device 12.1 to 12.3. However, as described in more detail below, when the slave unit 14 no longer receives the enabling signal or a user identification code of the slave unit 14 does not correspond to a master identification code included in the enabling signal 20, the electrical device 12.1 to 12.3 is disabled.

In particular, the master unit 18 is programmed with a unique master identification code which is provided in the smart card 28 and which is downloaded via the smart card reader 26 and stored in the master unit memory 24. The master unit 18 then via the powerline transceiver 34 intermittently transmits the enabling signal 20 on the wiring installation 16 and, accordingly, the master identification code is distributed on the wiring installation 16 to all electrical devices 12.1 to 12.3 connected or plugged into the wiring installation 16. The master identification code is encoded and, optionally, encrypted by the master controller 22 and converted into a suitable form for communication using one of the protocols, thereby defining the enabling signal 20 which is then fed to the powerline transceiver 34 via line 58 (see Figure 2). The

enabling signal 20 is then applied to the wiring installation 16 as shown by arrow 60. Thus, the master unit 18 generates a coded message which is periodically transmitted to the slave units 14 (see Figure 6).

As mentioned above, the slave unit 14 is operable to disable its associated electrical device 12.1 to 12.3 via the disabling means 54. For example, the disabling means 54 may be in the form of a switch or the like which is operable to disconnect power to critical circuitry of the electrical device 12.1 to 12.3. The slave unit 14, via its slave powerline transceiver 52, receives the enabling signal 20 and feeds it into the CEBus communications unit 50. The data is then fed into the decoder/encoder 48 to extract the master identification code. The slave controller 44 includes appropriate software (see Figure 7) for controlling its operation.

When a slave unit 14 does not include a user identification code e.g. it has not yet been programmed, the slave controller 44 disables the disabling means 54 so that the electrical device 12.1 to 12.3 operates in a normal fashion and does not require reception of the enabling signal 20 to function (see Figure 7). Thus, the software first determines whether or not the slave unit 14 is programmed as shown at block 62 and, if not, the electrical device 12.1 to 12.3 is enabled to operate in a normal fashion as shown at block 64. If, however, the slave unit 14 has been programmed with a user identification code, a counter is started as shown at block 66. Thereafter, the slave controller 44 determines whether or not a master identification code has been received by the slave unit 14 as shown at decision block 68. If no master identification code has been received, a timeout period is terminated as

shown at block 70 and the slave controller 44 activates the disabling means 54 as shown at block 72.

If a master code has been received, the slave controller 44 then decodes it via the decoder/encoder 48 (see Figure 3) as shown at block 74. Once the master identification code has been received, the user identification code is retrieved from the slave storage means 46 and the slave controller 40 which defines a comparator, compares the user identification code and the master identification code as shown at block 76. If the codes correspond, as shown at decision block 78, the disabling means 54 is deactivated as shown at block 80 so that the electrical device 12.1 to 12.3 may operate in a normal fashion. However, if the codes do not match or correspond, then the disabling means 54 is activated as shown at block 72 so that the electrical device 12.1 to 12.3 does not function properly. As shown by line 82, the software routine runs in a continuous loop to monitor whether or not the enabling signal 20 is received by the slave unit 14.

Referring in particular to Figure 4 of the drawings, reference numeral 84 generally indicates the steps in programming a slave unit 14. The software routine which effects the programming, is included in the programming circuitry 30 (see Figure 2) and, in use, the slave unit 14 is connected to the programming interface 32 as shown by block 86. Thereafter, the programming device determines whether or not the master unit 16 is ready as generally indicated by decision block 88, and, if not, an error is indicated (see block 90) on a display of the master unit 18. However, if the master unit 18 is ready, the software then checks to ascertain whether or not the slave unit 14 is ready as shown by decision block 92. If the slave unit 14 is not ready, the error message

is once again displayed as shown at block 90. A request to program slave signal will be sent to the slave unit 14 to enquire if the slave unit 14 is ready. The slave unit 14 will then return a "ready" or "not ready" signal.

If the slave unit 14 is not ready as shown at decision block 100, and the slave unit 14 has not been programmed as shown at decision block 102, then the counter 98 is decremented. If the counter is zero as shown at decision block 96, an error is indicated. If the counter is not zero then a request to programme the slave unit 14 as shown at block 94 is effected.

If, however, the slave unit 14 is ready, the master identification code is downloaded into the slave unit (see block 104) to define the user identification code which is stored in the slave memory 46. The programming circuitry 30 monitors when the user identification code has been downloaded as shown at decision block 106 and, if the code has not been downloaded, a counter 108 is decremented. If the counter has reached zero as shown at decision block 110, then an error message is displayed as shown at block 112. If, however, the user identification code has been successfully downloaded a check sum is performed as shown at block 114 whereafter the check sum is checked as shown at decision block 116. If the check sum is not okay then the counter is decremented as shown at 108. Once the check sum has been completed and the slave unit 14 is then programmed as shown at block 118 whereafter the display indicates the status as shown at block 120. The programming routine is then completed as shown at block 122 and the electrical device 12.1 to 12.3 may then be removed or disconnected from the programming interface 32. Once the slave unit 14 has been

programmed, it will only enable electrical devices 12.1 to 12.3 when it receives an enabling signal 20 from the master unit 18 which has programmed it.

Referring in particular to Figure 5 of the drawings, reference numeral 124 generally indicates a flow diagram of the steps involved in erasing a user identification code from a slave unit 14. As shown at block 126, the slave unit 14 is connected to the programming circuitry 30 via the programming interface 32 of the master unit 18. The software then checks whether or not the master unit 18 is ready as shown at decision block 128 and, if not, an error message is indicated on the display of the master unit 18 as shown at block 130. If the master unit 18 is ready, a check is then done as shown at decision block 132 to ascertain whether or not the slave unit 14 is ready and, if not, an error message is displayed as shown at 130.

If the slave unit 14 is ready then a test is conducted to ascertain whether or not the slave unit 14 has already been programmed as shown at decision block 134. If the slave unit 14 has not already been programmed an error message is displayed as shown at block 130. If, however, the slave unit 14 has already been programmed, a request to erase existing user identification code of the slave unit 14 is executed as shown at block 136. If the slave unit 14 is not ready as shown at decision block 138, then a counter is decremented as shown at block 140. If the counter reaches zero as shown at decision block 142, then an error message is indicated as shown at block 130. If, however, the counter is not zero then the software reverts to the request to erase the slave as shown at block 136.

If the slave unit is ready, then the existing user identification code stored in the memory 46 of the slave unit 14 is retrieved and the master identification code from the master unit 18 is also retrieved as shown at block 144. The existing user identification code and the master identification code are then compared as shown at block 146 to determine whether or not they correspond. If the codes do not correspond then an error message is generated as shown at block 148. For example, the electrical device 12.1 to 12.3 may have been removed without permission, for example stolen, from a particular location and to ensure that it is only usable when connected to its associated master unit 18, the slave unit 14 prevents itself from being reprogrammed. Thus, once a slave unit 14 has been programmed by a master unit 18 it bears a unique master identification code defined in the smart card 28 and can only be reprogrammed by that master unit 18.

If the user identification code and the master identification code match, the user identification code in the slave unit 14 is erased and a check sum is carried out as shown at block 150. If the check sum is okay, as shown at decision block 152, then the erased status of the slave unit 14 is displayed on the display as shown at block 154 and the appliance can now be removed from the programming interface 32 as shown at block 156. A slave unit 14 which does not include a user identification code, e.g. it may have been erased using the abovementioned procedure, does not disable its associated electrical device 12.1 to 12.3 when it does not receive the enabling signal as described above. If the check sum which is determined at block 152 is not okay, a counter is decremented as shown at block 158 and, if the count is zero (see block 160) then an error message is generated as

shown at block 148. If the count is not zero, then the program reverts to block 150.

The electrical devices 12.1 to 12.3 can be any type of electrical device such as home appliances, personal computers, machinery, television sets, video machines, laptops, computerised washing machines, washing machines, fridges, freezers, DVD players, hi-fi's, PDAs, radios, portable radios, kettles, toasters, drills, grinders, motors, liquidisers, turntables, sewing machines, sawing machines, overlockers, or the like. When these appliances or electrical devices 12.1 to 12.3 include the slave unit 14 which has been programmed by a master unit they can only operate in the zone or dwelling containing that master unit 18 which transmits an appropriate enabling signal with a unique master identification code corresponding to the unique user codes of the slave units 14 designated to the particular dwelling. Each slave unit 14 further includes a unique slave unit identification code which is stored in the slave memory 46. The slave unit identification code identifies the particular slave unit and, in certain embodiments of the invention, the slave unit 14 communicates the unique slave unit identification code via its slave powerline transceiver 52 to the master powerline transceiver 34 where the master unit 18 processes the information accordingly. Likewise, the slave unit 14 may include a unique device identification code which identifies the particular electrical device to which it is connected. This information may also be communicated to the master unit 18. Typically, the device identification code includes details such as the make, model, series, serial number, or the like of the electronic device e.g. Samsung video recorder type SD120 or Philips television, or the like.

The Inventor believes that the invention, as illustrated, provides a relatively simple disabling system 10 for disabling electrical devices 12.1 to 12.3 when they are removed from a particular zone or building. As each slave unit 14 requires reception of an enabling signal 20 bearing a unique master identification code which is associated with the particular zone or building for operation of its associated electrical device 12.1 to 12.3, when the electrical device 12.1 to 12.3 is removed from the building and it no longer receives the unique master identification code, it is disabled by the slave unit 14.

CLAIMS :

1. A method of disabling an electrical device when removed from a selected zone, the method including

providing a master unit and at least one slave unit in the zone, the slave unit being fitted to the electrical device;

transmitting an enabling signal in the zone from the master unit for reception by the slave unit;

monitoring reception of the enabling signal by means of the slave unit; and

disabling the electrical device when the enabling signal is not received.

2. A method as claimed in Claim 1, which includes encoding the enabling signal at the master unit and decoding the enabling signal at the slave unit.

3. A method as claimed in Claim 1 or Claim 2, in which the selected zone is a building and the method includes transmitting the enabling signal via an electrical power installation of the building.

4. A method as claimed in any one of the preceding claims, in which the slave unit includes a user identification code which is preprogrammed into the slave unit, and the method includes

transmitting a master identification code with the enabling signal, the master identification code being associated with the master unit;

comparing the master identification code and the user identification code at the slave unit; and

disabling the electrical device when the master and user identification codes do not correspond.

5. A method as claimed in Claim 4, in which the user identification code must be entered into the slave unit in order to enable re-programming of the slave unit for use with a different master unit.

6. A method as claimed in any one of the preceding claims, which includes programming a unique slave unit identification code into the slave unit thereby uniquely to identify the slave unit.

7. A method as claimed in any one of the preceding claims, which includes programming a unique device identification code into the slave unit thereby uniquely to identify the electrical device with which it is associated.

8. A method as claimed in Claim 7, which includes transmitting the unique device and slave unit identification codes from the slave unit to the master unit.

9. A method as claimed in any one of the preceding claims, which includes monitoring reception of the enabling signal via an electrical power cable of the electrical device.

10. A disabling system for disabling an electrical device when removed from a selected zone, the system including

a master unit including transmitter means for transmitting an enabling signal in the zone;

at least one slave unit operably connected to the electrical device, the slave unit including

receiver means for receiving the enabling signal when the electrical device is in the selected zone; and

disabling means for disabling the electrical device when the enabling signal is not received thereby to disable the electrical device when removed from the selected zone.

11. A system as claimed in Claim 10, in which the master unit includes an encoder for encoding the enabling signal and the slave unit includes a decoder for decoding the enabling signal.

12. A system as claimed in Claim 10 or Claim 11, in which the slave unit is integrally formed with the electrical device.

13. A system as claimed in any one of the preceding claims 10 to 12 inclusive, in which the selected zone is a building and the transmitter and receiver means are connected to an electrical power installation of the building and operable to communicate via the electrical power installation.

14. A system as claimed in any one of the preceding claims 10 to 13 inclusive, in which the master unit includes master storage means for storing a master identification code and the slave unit includes

slave storage means for storing a user identification code; and

comparator means for comparing the master and user identification codes, the disabling means being active when the codes do not correspond.

15. A system as claimed in Claim 14, in which the slave unit includes slave programming means for programming the user identification code into the slave storage means, the slave programming means being arranged so that the user identification code must be entered into the slave unit in order to enable re-programming of the slave unit for use with a different master unit.

16. A system as claimed in Claim 15, in which the slave programming means is operable to program a unique slave unit identification code into the slave storage means thereby uniquely to identify the slave unit.

17. A system as claimed in Claim 15 or Claim 16, in which the slave programming means is operable to program a device identification code into the slave storage means thereby uniquely to identify the electrical device.

18. A system as claimed in any one of the preceding claims 14 to 17, in which the master unit includes a master programming means for programming the slave unit with the user identification code.

19. A system as claimed in any one of the preceding claims 10 to 18, in which the master and slave units include smart card interfaces for receiving smart cards bearing identification codes.

20. A slave unit for use in a disabling system for disabling an electrical device in a selected zone, the slave unit being connected to the electrical device and including

receiver means for receiving an enabling signal transmitted by a master unit associated with the zone when the electrical device is in the selected zone; and

disabling means for disabling the electrical device when the enabling signal is not received to disable the electrical device when removed from the selected zone and thereby prevent use of the device.

21. A slave unit as claimed in Claim 20, which includes a decoder for decoding the enabling signal operatively encoded by the master unit.

22. A slave unit as claimed in Claim 20 or Claim 21, in which the slave unit is integrally formed with the electrical device.

23. A slave unit as claimed in any one of the preceding claims 20 to 22 inclusive, in which the selected zone is a building and the receiver means is operatively connected to an electrical power installation of the building and operable to receive communications via the electrical power installation.

24. A slave unit as claimed in any one of the preceding claims 20 to 23 inclusive, in which the slave unit includes

slave storage means for storing a user identification code; and

comparator means for comparing a master identification code included in the enabling signal and the user identification code, the disabling means being active when the codes do not correspond.

25. A slave unit as claimed in Claim 24, which includes slave programming means for programming the user identification code into

the slave storage means, the slave programming means being arranged so that the user identification code must be entered into the slave unit in order to enable re-programming of the slave unit for use with a different master unit.

26. A slave unit as claimed in Claim 25, in which the slave programming means is operable to program a unique slave unit identification code into the slave storage means thereby uniquely to identify the slave unit.

27. A slave unit as claimed in Claim 25 or Claim 26, in which the slave programming means is operable to program a device identification code into the slave storage means thereby uniquely to identify the electrical device.

28. A slave unit as claimed in any one of the preceding claims 20 to 27, which includes a smart card interface for receiving a smart card bearing at least one identification code.

29. A master unit for use in a disabling system for disabling an electrical device in a selected zone by means of a slave unit connected to the electrical device, the master unit including transmitter means for transmitting an enabling signal in the zone for reception by the slave unit which is operable to disable the device if the enabling signal is not received.

30. A master unit as claimed in Claim 29, which includes an encoder for encoding the enabling signal for transmission to the slave unit.

31. A master unit as claimed in Claim 29 or Claim 30, in which the selected zone is a building and the transmitter means is connected to an electrical power installation of the building and operable to communicate with the slave unit via the electrical power installation.

32. A master unit as claimed in any one of the preceding claims 29 to 31 inclusive, which includes master storage means for storing a master identification code for inclusion with the enabling signal and which uniquely identifies the master unit.

33. A master unit as claimed in any one of the preceding claims 29 to 32, in which the master unit includes a master programming means for programming the slave unit with the user identification code.

34. A master unit as claimed in any one of the preceding claims 29 to 33, which includes a smart card interface for receiving a smart card bearing at least one identification code.

35. A method of disabling an electrical device as claimed in Claim 1, substantially as herein described and illustrated.

36. A disabling system for disabling an electrical device as claimed in Claim 10, substantially as herein described and illustrated.

37. A slave unit for a disabling system as claimed in Claim 20, substantially as herein described and illustrated.

38. A master unit for a disabling system as claimed in Claim 29, substantially as herein described and illustrated.

39. A new method of disabling an electrical device, a new disabling system, a new slave unit or a new master unit substantially as herein described.

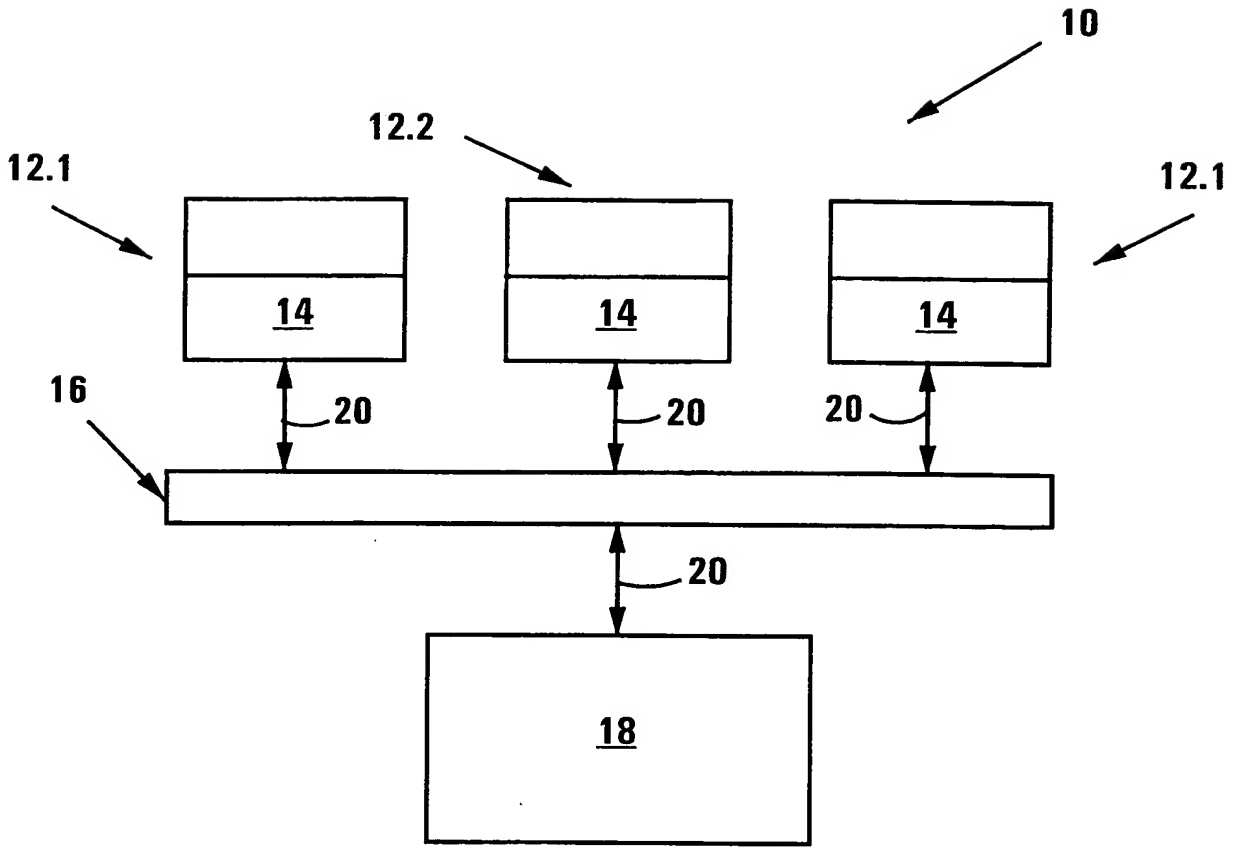

FIG 1

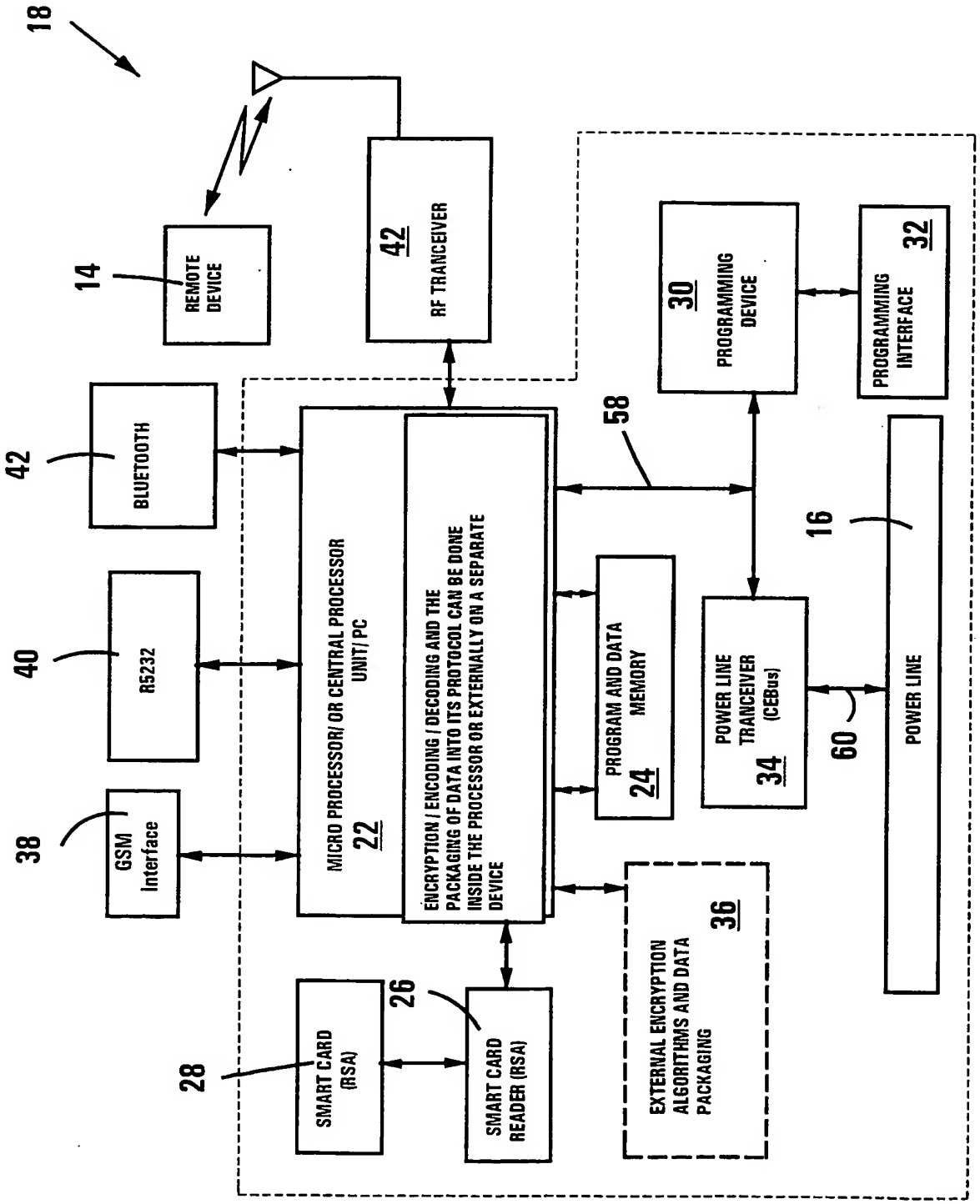
18
14
REMOTE DEVICE
42
RF TRANCEIVER
30
PROGRAMMING DEVICE
32
PROGRAMMING INTERFACE
42
BLUETOOTH
58
40
R5232
MICRO PROCESSOR/ OR CENTRAL PROCESSOR UNIT/ PC
22
ENCRYPTION / ENCODING / DECODING AND THE PACKAGING OF DATA INTO ITS PROTOCOL CAN BE DONE INSIDE THE PROCESSOR OR EXTERNALLY ON A SEPARATE DEVICE
PROGRAM AND DATA MEMORY
24
16
38
GSM Interface
POWER LINE TRANCEIVER (CEBus)
34
60
POWER LINE
EXTERNAL ENCRYPTION ALGORITHMS AND DATA PACKAGING
36
28
SMART CARD (RSA)
26
SMART CARD READER (RSA)

FIG 2

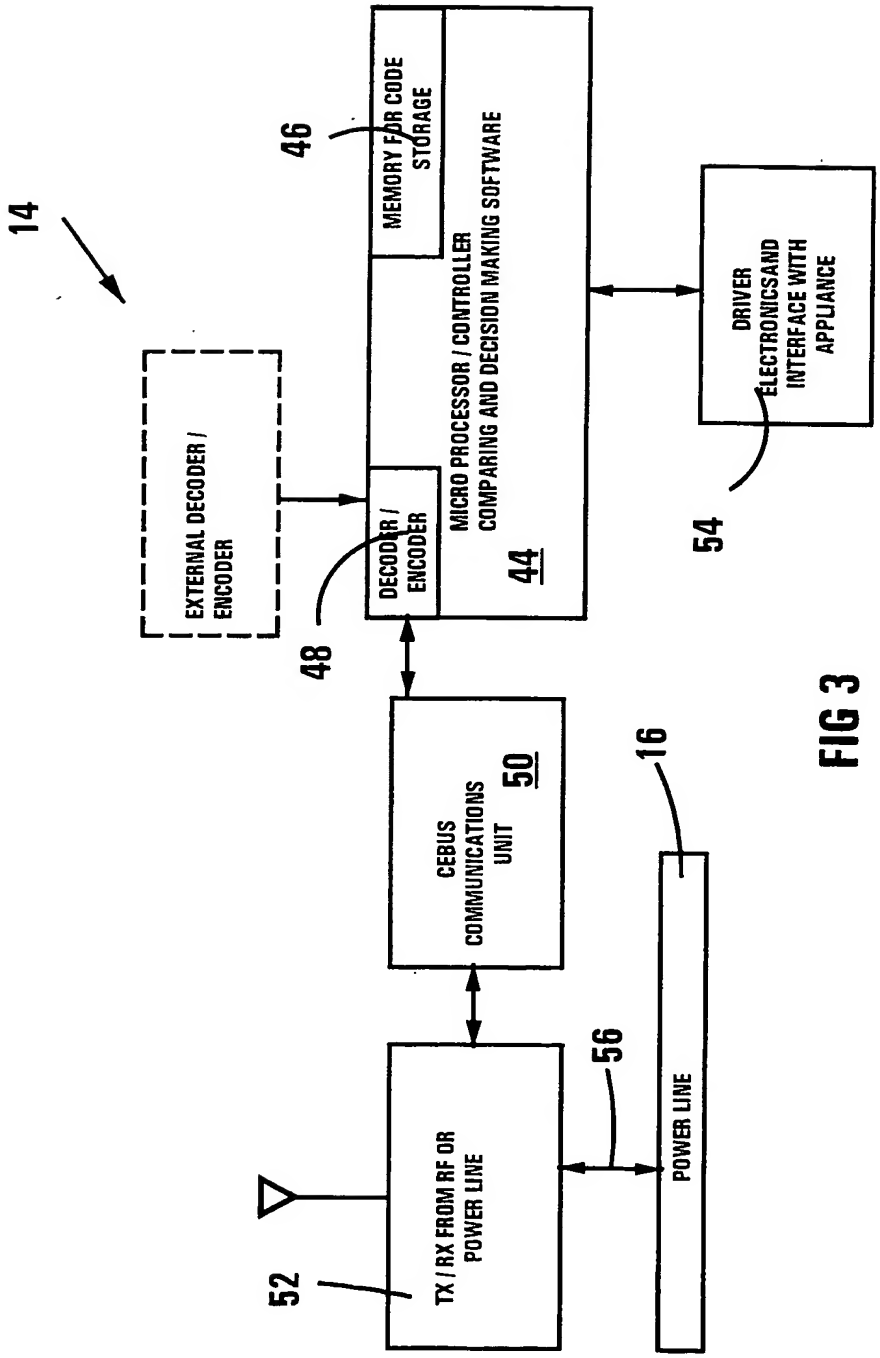
14
46
MEMORY FOR CODE STORAGE
MICRO PROCESSOR / CONTROLLER COMPARING AND DECISION MAKING SOFTWARE
44
DRIVER ELECTRONICSAND INTERFACE WITH APPLIANCE
54
EXTERNAL DECODER / ENCODER
DECODER / ENCODER
48
CEBUS COMMUNICATIONS UNIT 50
16
56
POWER LINE
TX / RX FROM RF OR POWER LINE
52

FIG 3

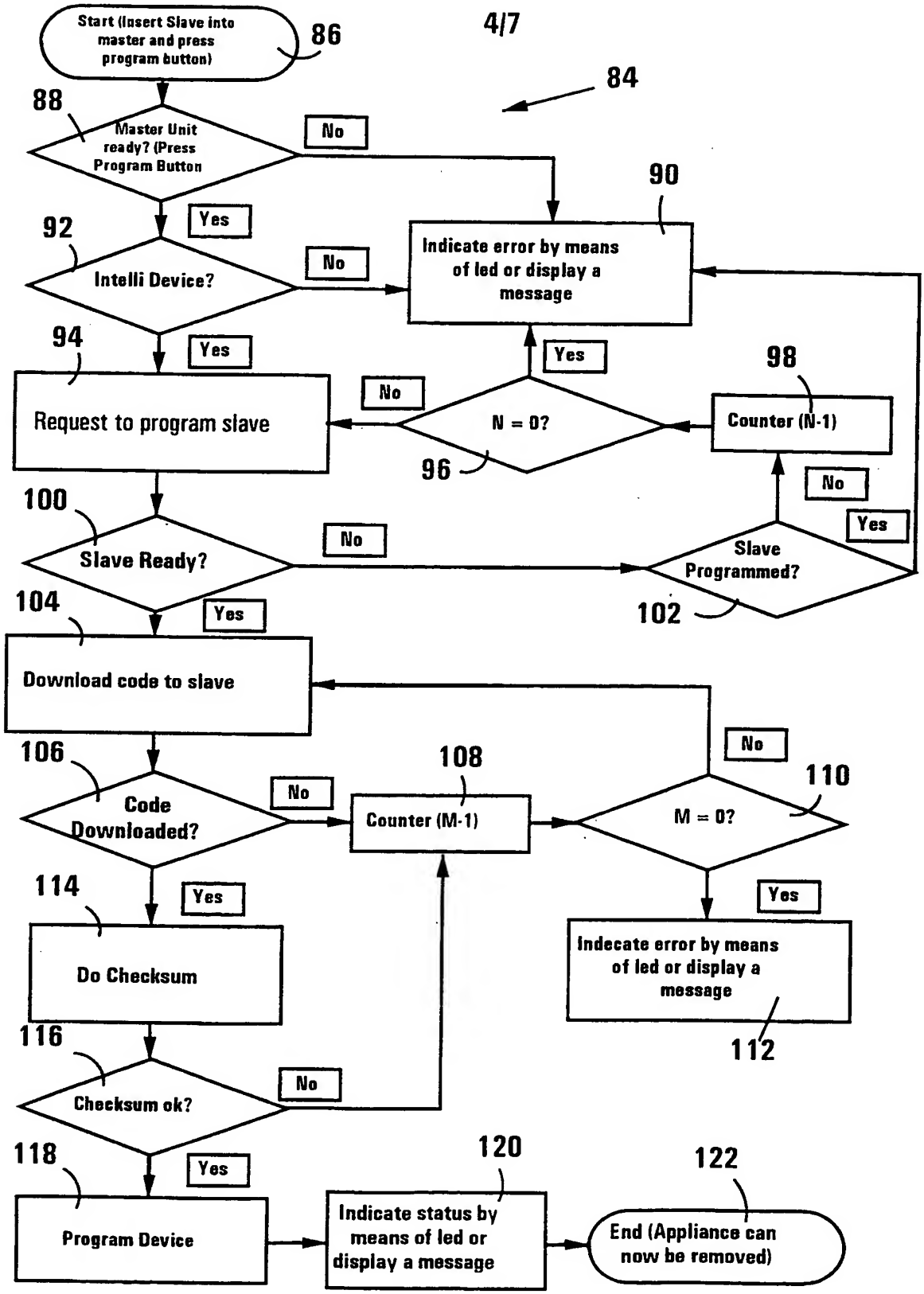
Start (Insert Slave into master and press program button)
86
84
88
Master Unit ready? (Press Program Button
No
Yes
90
92
Intelli Device?
No
Indicate error by means of led or display a message
Yes
94
Yes
98
Request to program slave
No
N = 0?
Counter (N-1)
96
No
100
Slave Ready?
No
Slave Programmed?
Yes
102
104
Yes
Download code to slave
No
106
108
110
Code Downloaded?
No
Counter (M-1)
M = 0?
114
Yes
Yes
Do Checksum
Indecate error by means of led or display a message
116
112
Checksum ok?
No
118
120
122
Yes
Program Device
Indicate status by means of led or display a message
End (Appliance can now be removed)

FIG 4

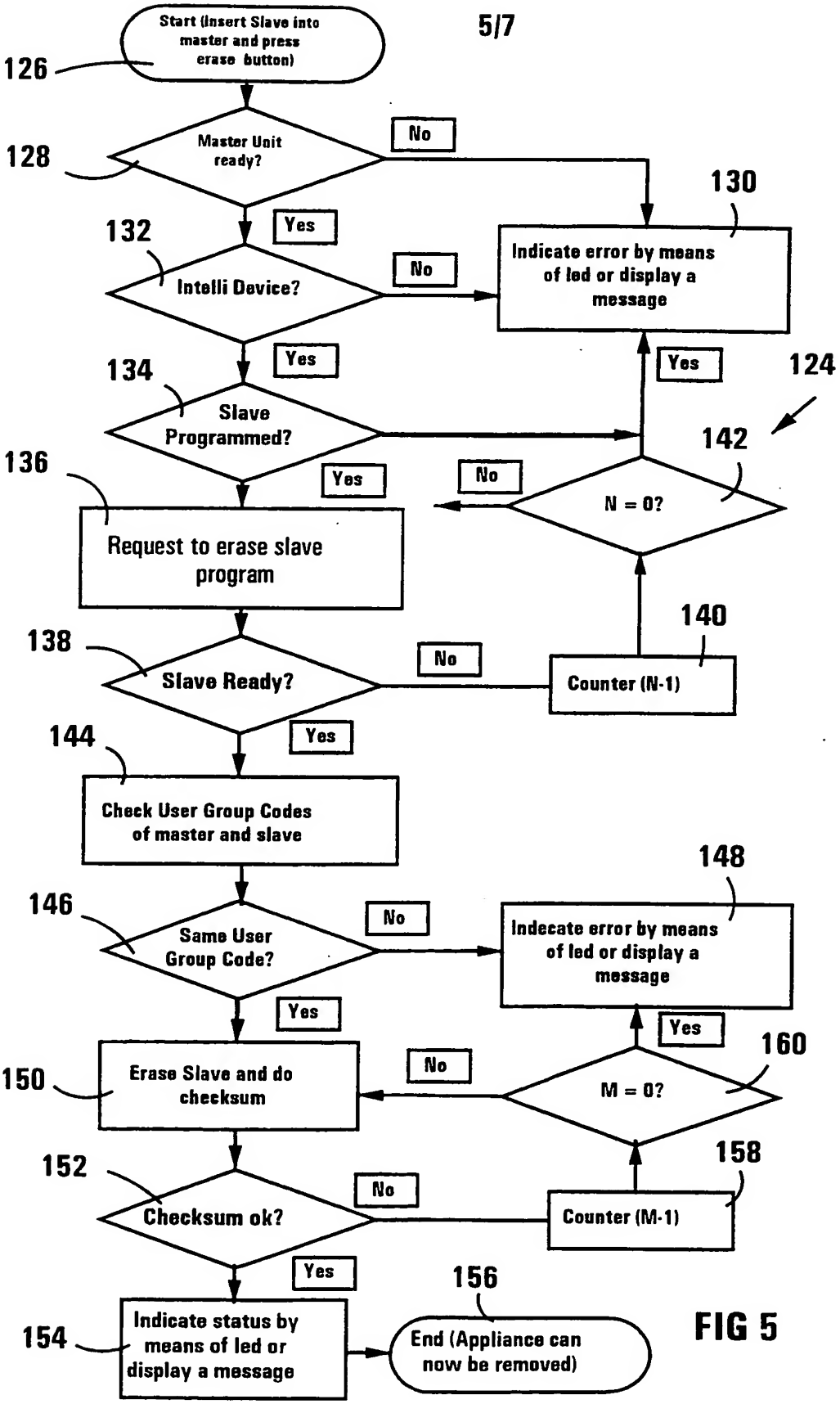
Start (Insert Slave into master and press erase button)
126
Master Unit ready?
128
No
Yes
130
Indicate error by means of led or display a message
132
Intelli Device?
No
Yes
134
Slave Programmed?
Yes
124
142
N = 0?
No
136
Request to erase slave program
Yes
140
138
Slave Ready?
No
Counter (N-1)
Yes
144
Check User Group Codes of master and slave
148
146
Same User Group Code?
No
Indecate error by means of led or display a message
Yes
Yes
160
150
Erase Slave and do checksum
No
M = 0?
158
152
Checksum ok?
No
Counter (M-1)
Yes
156
154
Indicate status by means of led or display a message
End (Appliance can now be removed)

FIG 5

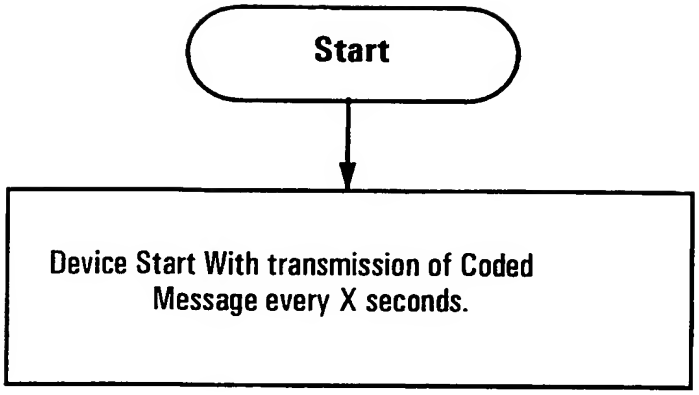
Start
Device Start With transmission of Coded Message every X seconds.

FIG 6

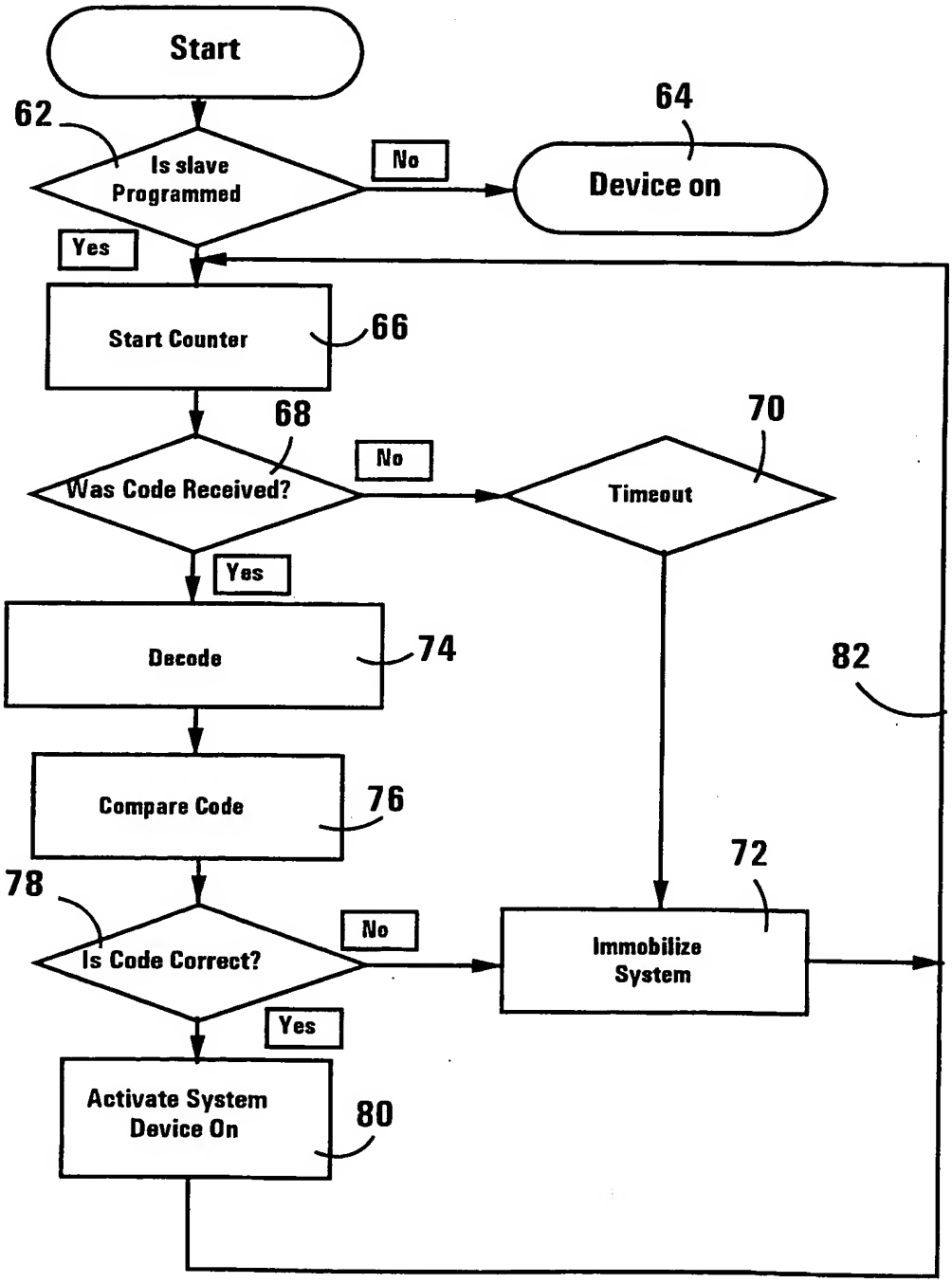
Start
62
Is slave Programmed
No
64
Device on
Yes
Start Counter
66
68
Was Code Received?
No
70
Timeout
Yes
Decode
74
82
Compare Code
76
72
78
Is Code Correct?
No
Immobilize System
Yes
Activate System Device On
80

FIG 7

INTERNATIONAL SEARCH REPORT

Inten nal Application No
PCT/IB 99/01920

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08B13/14 G08B25/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G08B H04L G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 021 779 A (BISAK MICHAEL) 4 June 1991 (1991-06-04) column 1, line 67 -column 2, line 19 column 2, line 45 - line 59 column 4, line 33 - line 50 column 5, line 45 - line 54 claims 1,2,4,9 --- -/--	1-5, 9-15, 20-25, 29-32

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 March 2000	16/03/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	De la Cruz Valera, D

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/IB 99/01920

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 229 025 A (ELOCKTRONICS LIMITED) 12 September 1990 (1990-09-12) page 2, line 19 - line 35 page 3, line 17 - line 25 page 4, line 6 - line 7 page 5, line 5 - line 9 page 7, line 1 - line 21 figure 1	1,3, 6-10, 12-14, 16, 18-20, 22-26, 28,29, 31-34
X	WO 96 03728 A (KANG BALJIT SINGH) 8 February 1996 (1996-02-08) page 1, line 19 -page 2, line 7 page 2, line 15 - line 16 figure 1	1,4-7, 10, 14-17, 20, 24-27,30

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/IB 99/01920

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5021779 A	04-06-1991	CA 1335606 A	16-05-1995
		AU 596372 B	03-05-1990
		AU 6282486 A	10-03-1987
		WO 8701229 A	26-02-1995
		EP 0232390 A	19-08-1987
GB 2229025 A	12-09-1990	NONE	
WO 9603728 A	08-02-1996	AU 2986495 A	22-02-1996
		GB 2304443 A,B	19-03-1997